

WHAT IS CLAIMED IS:

1. A motor/generator comprising

a first rotor provided with a plurality of magnetic poles by a magnet;

a second rotor provided with a plurality of magnetic poles by a magnet
and a plurality of rotor coils; and

a stator provided with a plurality of stator coils applying a rotational
force on the first rotor and the second rotor when a composite polyphase
alternating current is supplied to the stator coils.

2. The motor/generator as defined in Claim 1, wherein the number of magnetic
poles in the magnet provided in the first rotor is equal to the number of poles
in the magnet provided in the second rotor.

3. The motor/generator as defined in Claim 1, wherein the composite polyphase
alternating current comprises an alternating current forming a rotating magnetic
field applying a rotational force on the first rotor and an alternating current
forming a rotating magnetic field applying a rotational force on the second
rotor.

4. The motor/generator as defined in Claim 1, wherein the motor/generator
further comprises an exciting circuit which excites a part of the rotor coils by
supplying a first exciting current to the part of the rotor coils to vary the ratio
of magnetic poles of the first rotor and the second rotor to a ratio other than
1:1.

5. The motor/generator as defined in Claim 4, wherein the motor/generator functions as a magnetic coupling in which one of the first rotor and second rotor rotates the other of the first rotor and the second rotor in synchronization by suspending the excitation of the part of the rotor coils by the exciting circuit and suspending the supply of the composite polyphase alternating current to the stator coils.

6. The motor/generator as defined in Claim 4, wherein the second rotor is provided with a plurality of pairs of the rotor coils and the motor/generator functions as a magnetic coupling in which one of the first rotor and second rotor rotates the other of the first rotor and the second rotor in synchronization by exciting a specific pair of the rotor coils by a second exciting current and suspending the supply of the composite polyphase alternating current to the stator coils.

7. The motor/generator as defined in Claim 4, wherein the motor/generator functions as a magnetic coupling by which one of the first rotor and second rotor rotates the other of the first rotor and the second rotor in synchronization by supplying a third exciting current to the part of the rotor coils which flows in a direction opposite to the first exciting current, and suspending the supply of the composite polyphase alternating current to the stator coils.

8. The motor/generator as defined in Claim 4, wherein the second rotor is provided with a plurality of pairs of the rotor coils and the motor/generator

functions as a magnetic coupling which varies a coupling force according to an excitation state of the plurality of pairs of the rotor coils.

9. The motor/generator as defined in Claim 4, wherein the plurality of the rotor coils are connected in series and are excited by a direct current.

10. The motor/generator as defined in Claim 9, wherein the motor/generator further comprises two collector rings which supply an exciting current to the pair of the rotor coils.

11. A motor/generator comprising,

a first rotor provided with a plurality of magnetic poles by a magnet;

a second rotor provided with the same number of magnetic poles as the first rotor by a magnet;

a stator provided with a plurality of stator coils applying a rotational force on the first rotor and the second rotor when a composite polyphase alternating current is supplied to the stator coils, and

a device which limits the rotation of the second rotor in a specified direction.

12. The motor/generator as defined in Claim 11, wherein the first rotor is connected to a drive wheel of a vehicle, the second rotor is connected to an engine mounted in the vehicle, and the rotation limitation device comprises a one-way clutch which is interposed between the engine and the second rotor.

13. The motor/generator as defined in Claim 12, wherein the motor/generator further comprises a device which locks the rotation of the first rotor.

14. The motor/generator as defined in Claim 12, wherein the motor/generator further comprises a lock-up clutch which limits relative rotation of the first rotor and the second rotor.